



Biomass Cofiring General Kickoff Meeting

Western Kentucky Energy
Biomass Gasification Cofiring
Project

NETL Co-op Agreement No. DE-PS26-00NT 40898

Participants

- ◆ US DOE NETL – Program Coordinator
- ◆ Nexant – Overall Engineering and Cost Estimate
- ◆ Primenergy – Biomass Gasifier Provider
- ◆ Western Kentucky Energy Corp –
Project Site - Reid Plant





Background

- ◆ Cofire existing coal fired power boiler with low-Btu gas produced from poultry litter
- ◆ Within 50 miles of ~210,000 t/y of poultry litter
- ◆ Gasification better alternate to landfill

Project Issues

- ◆ Optimum gasifier size to integrate with existing boiler
- ◆ Verify performance and operating parameters of gasifier on chicken based poultry litter.
- ◆ Confirm minimum impact on existing boiler operation and emissions

Project Benefits

- ◆ Environmentally more acceptable premium power
- ◆ Reduce landfill and runoff into waterways
- ◆ Reduce release of greenhouse gases from landfill
- ◆ Potential for reduced fuel and hence operating costs
- ◆ Potential for fertilizer from ash

Design Basis

- ◆ Boiler – Pulverized coal-fired, 63 MWe, built in 1964, Kentucky coal, 1300 psi/ 955 °F steam
- ◆ Fuel – Poultry litter (droppings and biomass bedding)
- ◆ Gasifier – Primenergy KC-18, air blown, fixed-bed, updraft counterflow
- ◆ Product gas – nominally 100 Btu/cu ft, 1000-1600°F

Reid Plant

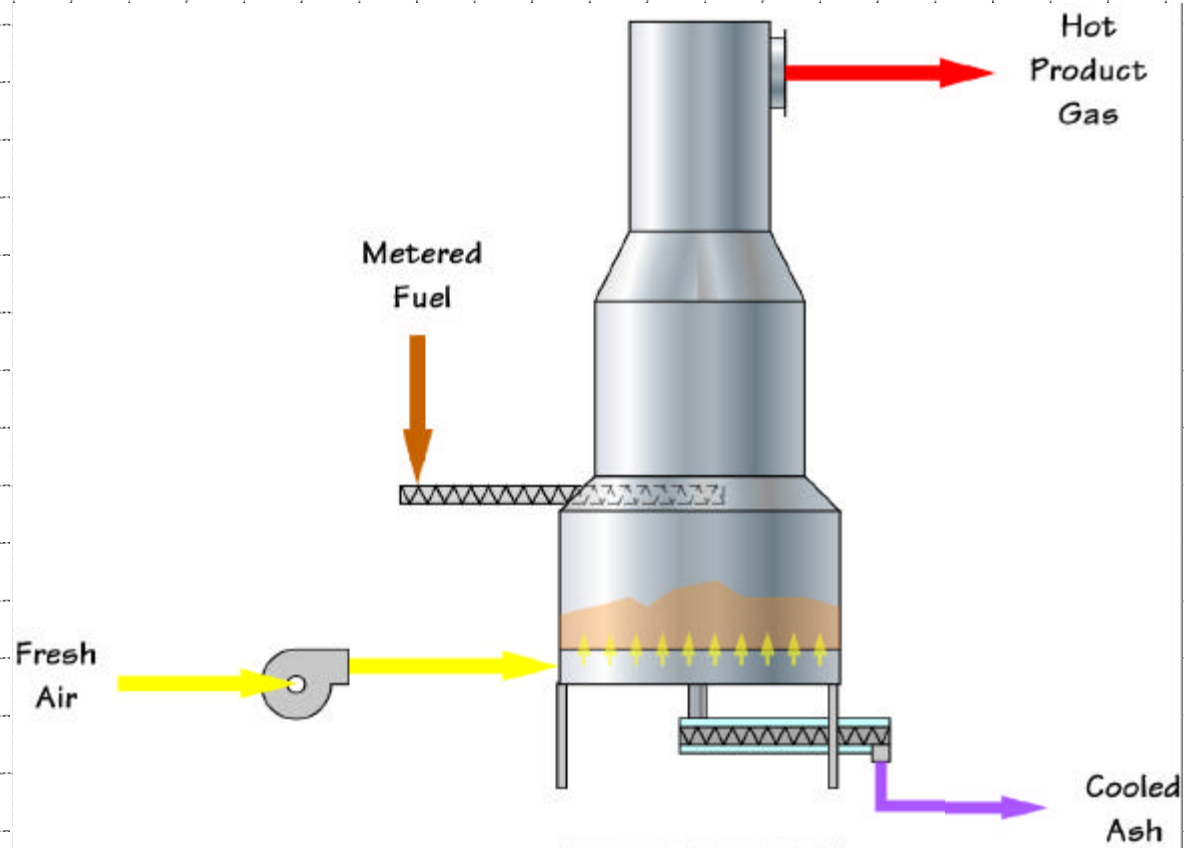


WESTERN
KENTUCKY
ENERGY

NEXANT_{LLC}

Primenergy
biomass energy conversion _{LLC}

Primenergy KC-18 Gasifier



Project Phases

◆ Phase 1 – Feasibility study

- Confirm fuel availability and characterization
- Evaluate integration of gasifier and boiler
- Determine optimum gasifier size
- Prepare preliminary design and plant layout
- Cost estimate and plant economics

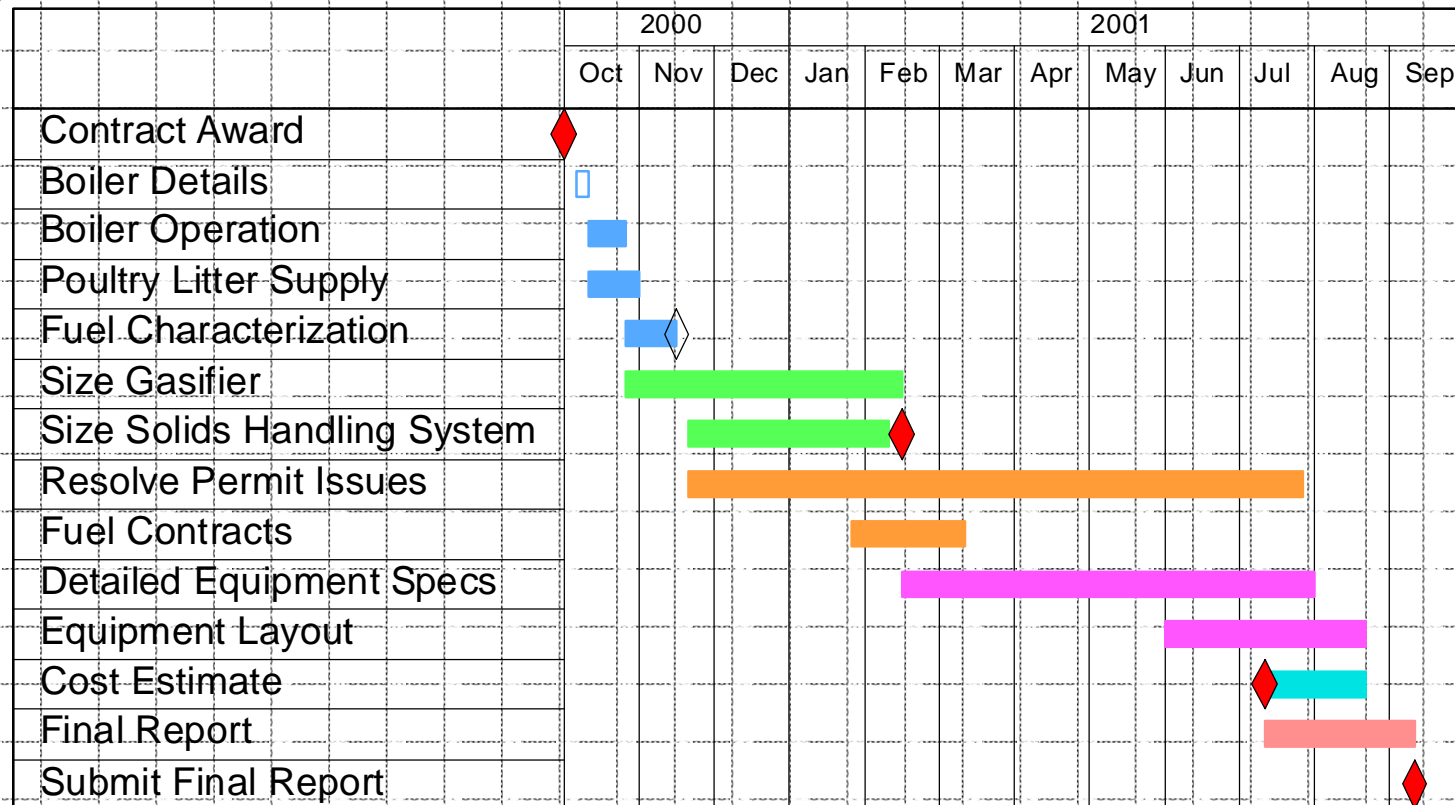
◆ Phase 2 – Final design, construction, and operation

Project Duration

◆ Phase 1: Preliminary Design
12 months

◆ Phase 2: Implementation
18 months

Project Schedule



Project Milestones

- ◆ Contract Award
- ◆ Final Design Basis
- ◆ System Design
- ◆ Basis for Cost Estimate
- ◆ Final Report

Project Plan – 15 Tasks

- ◆ Confirm design basis
- ◆ Design/size equipment
- ◆ Market Analysis
- ◆ Permit Issues
- ◆ Capital and Operating Cost

Currently Underway

- ◆ Project Kickoff Meeting
- ◆ Obtaining details on site and boiler
- ◆ Confirming details on expected gasifier operation and gas composition.
- ◆ Securing boiler vendor to provide details on burner, boiler penetration, & boiler analysis

Next Steps

- ◆ Confirm fuel supply & obtain samples
- ◆ Obtain details on fuel characterization
 - Proximate and ultimate analysis
 - Slagging characteristics
 - Sizing
- ◆ Begin designs for fuel handling, gasification, & boiler modifications

Final Product from Phase 1

◆ Preliminary Design

- Process flow diagrams and P&IDs
- Performance at full and part-load
- Plant layout with 3-D renditions
- Equipment specifications, including major piping and control systems
- Emissions, water effluent, and solid waste

Final Product (cont.)

◆ Capital Cost Estimate

- Preliminary - $\pm 15\%$
- All but smallest equipment defined
- Quotes on all major items

◆ Economics

- Operating costs – daily and annual
- Overall plant return on investment